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ABSTRACT

The hypothesis that teacher reinforcement behavior has a different effect on "internal" children (those who believe that they can affect their environment through their own behavior) than on "external" children (those who feel controlled by fate or influences much stronger than themselves) is the basis of this study. This hypothesis is derived from two paradoxical assumptions: (1) that internal children perceive more readily the connection between their actions and teacher reinforcement behavior and thus learn more and (2) that external children, lacking self-confidence, are more sensitive to teacher reinforcement behavior, and thus learn more than internal children. However, when 910 sixth-grade students were divided into these two categories by means of the Internal-External Control Scale and pre- and posttested on the Metropolitan Achievement Test Battery, no significant difference was found between the change scores of internal and external children for the same degree of teacher reinforcement behavior. It was found, however, that for the entire group, a greater degree of teacher reinforcement behavior resulted in increased student learning. (Being of marginal legibility, data tables have been omitted. Available from clearinghouse or author at Case Western Reserve Univ.) (RT)

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The Reactions of Internal and External Children to Patterns of Teaching Behavior

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When one enters a classroom he sees two operants -- the teacher and the pupils. Whether the teacher is lecturing, the group is conversing, or silently reading, the forces are interacting with each other to some degree. In most classrooms the teacher is the most powerful agent, and she alters the amount and kind of active participation she solicits from the students. The preponderance of the time may be spent in lecturing, stopping occasionally to answer questions, or even dissuading spontaneous student participation by allowing only teacher initiated questions. On the other hand, a teacher may continually strive to educe ideas from the pupils and use these as her educative tools. In both cases the teacher is influencing the students, but there is a difference in strategy. The first instance Flanders labels direct teacher influence; the second, indirect teacher influence (1965).

Flanders postulates that teacher influence may range from direct to indirect and that this influence lies on a measurable continuum. He has developed a method of quantifying the verbal statements of the teacher and pupils called "interaction analysis." The amount of praise and encouragement, criticism, and attendance to and use of students' ideas utilized by the teacher is measurable and is consistently different between teachers.

Flanders theorizes, and lends empirical support to his thesis, that not only do teachers differ along this dimension, but this difference of influence differentially affects the pupils. Thus, students with indirect teachers learn more, or at least perform better on tests than do pupils with direct teachers (Flanders, 1960, 1964a, 1964b).

By discriminate use of her verbal skills the teacher can communicate praise, affection, and more symbolic signs of positive evaluation; conversely she can relay punishment, disgust, and negative indicators. The desire to attain the positive reinforcement or escape the negative reinforcement leads the child to work toward the mastery of the intellectual skills which otherwise may be intrinsically boring and meaningless to him. But is the value of the reinforcement the same for all children? Will a positive statement have the same meaning to a child who believes that through his own behavior he can affect his environment as it will have to one who feels controlled by luck, fate, people, and/or influences much stronger than himself?

Consider two children receiving an "A" on an examination. The first believes that he is the propitiator of his success and concludes that by his persistent effort he has prospered. The second does not perceive himself in control of his success and projects the source of his good fortune to an external object, luck, or fate. He concludes that the teacher asked easy questions, he was lucky to have studied the "right" thing, or "the gods were with him." The personality variable associated with the degree to which an individual tends to perceive the consequences of his actions as being within or beyond his control has been entitled "Internal versus External Control of Reinforcement" (Rotter, Seeman & Liverant, 1962). Measures of this concept--the Internal-External Control scale (Rotter, 1966), the Intellectual Achievement Responsibility scale (Crandall, et al, 1965), the Children's Picture Test of Internal Control (Battle and Rotter, 1963),

the Multidimensional Internal-External Control scale (Gurin, et al, 1969)-- have been used to explain a variety of behaviors: risk taking preferences (Phares, 1957; James, 1957), resistance to suggestion and exertion of influence over others (Crowne & Liverant, 1963), occupational and educational aspirations (Gurin & Katz), persistence in achievement tasks (James & Rotter, 1958), and academic performance (Coleman, et al, 1966).

The interaction between the psychological organization of the child and the mode of teaching provided the point d'appui for this study. It was proposed that both the child's intrapsychic forces and the teacher's strategy direct and determine the amount of attention the child invests in the attainment of academic skills.

From the realm of personality variables the internal versus external control of reinforcements were isolated for investigation. From the domain of the classroom, verbal statements of the teacher provided the center of concentration.

Empirical evidence was sought to determine the relationship between belief in internal versus external control of reinforcement and the amount of praise and encouragement, criticism, and attendance to and use of students ideas extended by the teacher. A posteriori answers were investigated to such questions as: Does praise and encouragement by the teacher have an effect on the learning of children? Is the effect different for internal and external children? What of the effect of criticism in this dualism? And, finally, when the teacher attends to and accepts the ideas of children, do they show greater evidence of learning? Is the evidence different for internal and external children?

Teachers differ in the amount and kind of reinforcement they use while interacting with the students in their classroom. Pupils differ on a personality dimension entitled: internal versus external control of reinforcement; that is, they differ in the degree to which they perceive positive and/or negative

events as being under personal control or beyond personal control. Given these axioms let us interpret them in the light of Rotter's Social Learning Theory formula:

$$BP_{x,s_1,r_a} = f(E_{x,r_{a,s1}} \& RV_a)$$

which states:

> The potential for behavior x to occur in situation 1 in relation to reinforcement a is a function of the expectancy x in situation 1 and the value of reinforcement a in situation 1 (Rotter, 1954, p. 108).

When an individual is reinforced, the expectancy that a particular behavior or event will be followed by that reinforcement in the future is trengthened. Once this reinforcement sequence is developed, the failure of the reinforcement to occur will reduce or extinguish the expectancy. Thus, in a given situation, the occurrance of either a positive or negative reinforcement will strengthen or weaken potential for a particular behavior to recur on the same or similar situations. Let us relate this to a classroom situation. The behavior which we wish to recur is learning; the situation, in its broadest sense, is the classroom; and the source of the reinforcement, is the teacher. It would follow that when the teacher positively reinforces the child with praise and encouragement and by using his ideas, when the child does learn, his potential for learning would be strengthened. Conversely, when the teacher negatively reinforces the child by criticising him, ignoring his ideas, or omitting praise, his potential for learning will be weakened. Thus it was hypothesized that (1) Pupils of high praise teachers would learn more than would pupils of low praise teacher; (2) Pupils of low criticism teachers would learn more than would pupils of high criticism teacher; and (3) pupils whose teachers use and accept their ideas would learn more than would pupils of teachers who did not use and accept their ideas.

What effect does the individual's history of reinforcement have on the Gestalt? As a child develops, he learns to recognize certain events as having causal

relationships, and others as not. When a causal relationship is perceived by a subject between his own behavior and the reinforcement, the occurrence of the reinforcement will increase the expectancy. However, when a person does not see a rdationship between the reinforcement and his behavior, the occurrance of the reinforcement will not increase an expectancy to the same extent as when a causal relationship is perceived. Likewise, the non-occurrance of a reinforcement will not reduce the expectancy as much when a causal relationship is not seen as when it is seen. An individual who believes in external control perceives a reinforcement which follows some action of his own as not being entirely contingent upon his action. Whereas, an individual who perceives that the event is contingent upon his own behavior believes in internal control. Thus, for internal students, the occurrance of a reinforcement will increase the expectancy that a particular behavior will be followed by that reinforcement in the future, more than for external students. But the external student does see a relationship between his action and some external force. It is suggested here that the internal child sees himself controlling his behavior, that he sees this behavior as causing reinforcement, which strengthens the expectancy that the behavior will be followed by that reinforcement in the future. On the other hand, the external child perceives that his behavior is being controlled by some external force, he divorces himself from the behavior, thus he cannot clearly delineate the relationship between the reinforcement and the behavior, and the bond between expectancy and behavior is weakened.

Let us put these two kinds of individuals into a learning situation. The internal student performs well; he sees this performance as a function of himself; his performance is reinforced; he perceives a relationship between this performance and the reinforcement; he thus, expects that when he repeats this performance it will again be reinforced; so he probably repeats the performance.

The external student performs well; he feels this performance as being controlled by some external force; his performance is reinforced; he does not internalize this reinforcement but sees it as task-specific; the relationship between the performance and the reinforcement is not clear; thus, he cannot predict that when he repeats this performance it will again be reinforced; so that the probability that he will repeat the performance is less than for the internal student. Thus, the learning paradigm differs for external and internal children, and this difference results in different degrees of success in learning. It would be expected that the group with the most efficient paradigm would experience the greater learning. It was therefore hypothesized that the internal children would learn more than would the external children.

In this study there were two major assumptions on the basis of which predictions were made that internal and external children would be expected to respond differentially to the reinforcement represented by the teacher's reactions.

One assumption led to the prediction that internal children would learn better than external children. The second assumption, a paradoxical one, led to the prediction that external students would be more sensitive to the differences between positive and negative reinforcements from the teacher, and that the difference between learning under positive and negative reinforcement would therefore be greater for the external children. This prediction was based on an assumption that the internal child is not so exclusively dependent upon the teacher's reinforcement as is the external child. For, in addition to the teacher's reinforcement, the internal child has another source of reinforcement -- himself. The external child, however, cannot reinforce himself. With the feeling that these forces cannot be controlled goes an undue dependence on and vulnerability to these forces. The paradox is this: one might expect that externally-controlled children, not seeing the connection between their own behavior and the

reinforcement and therefore not learning, would be less sensitive than internally-controlled children; but actually their own feeling of lack of control makes them unduly sensitive. Even though the external children do not learn so much as do the internal children, they <u>are</u> sensitive, and, therefore, they are expected to learn differentially.

The above hypothesis states the common consequence of this paradox, namely, that internal pupils would learn more, no matter which explanation is accepted. However, it was predicted that the learning of external children would be more affected by the praise and encouragement of the teacher than would be the learning of internal children. That the learning of external children would be more affected by the criticism of the teacher than would be the learning of internal children. And, the teacher's use of the student's ideas would affect learning in external children more than in internal children.

The data were gathered from 910 students and 30 teachers from sixth-grade classes in the suburban Detroit area. The majority of the students in the 30 classrooms were eleven years of age, although the ages ranged from nine to more than thirteen. There were 432 girls and 384 boys. When the fathers' occupations were converted to NORC scores the socio-economic status showed a fairly normal distribution, with the majority of the cases falling in the middle class.

The sample included approximately 677 Caucasian students, 122 Negro students, and eight American Indians, East Indians, and Chinese students. The average I. Q. was 108.69 with a standard deviation of 15.99.

The design of the study required four independent variables to be used in testing the hypotheses: Internal-External Control of Reinforcement, teacher encouragement, teacher criticism, and the teacher's use of the students' ideas. Adjusted achievement change scores were the dependent variable.

Rotter's Internal versus External Control of Reinforcement scale was revised

for use with sixth-grade students. Factor analysis, facet analysis, and item analysis were performed on this revised children's scale; and reliability and validity coefficients were determined.

The Children's I. E. scale and the Metropolitan Achievement Test Battery were administered to the students. Trained interaction analysis observers recorded the spontaneous verbal behavior in the classroom. Each classroom was observed for eight to ten hours (6,000 - 8,000 tallies) over a four month period. At the conclusion of the observation, the Children's I. E. scale and the Metropolitan Achievement Test Battery were again administered to the 30 classes.

Since the study was concerned with growth and change in achievement rather than with the actual level of achievement of the students, it seemed important to express achievement in terms of change. For this reason, change scores were used as measures of growth in achievement of basic skills. However, since there were differences among group means in both I. Q. and in initial achievement scores (pre-test), the mean change scores alone would have given a spurious picture of group growth in achievement. Therefore, it was necessary to adjust the change scores. It was originally planned to adjust the change scores on both I. Q. and initial achievement; however, upon investigation of the interrelationships among I. Q., initial achievement scores, and change scores; it was discovered that after controlling change for one variable, the introduction of the second variable had a minimal effect. That is, the computation of the multiple correlation by the square root method--using intercorrelations between pre-test, I. Q., and post-test--resulted in a very small increase in the correlation over the coefficient obtained by correlating pre-test and post-test alone. Because of the minimal effect of I. Q., only initial achievement was used as a covariate. The analysis of coveriance was the statistical technique selected to adjust the change scores and to compare the growth in achievement under different conditions of teacher influence.

It was discovered that the subjects were disproportionately distributed in the sub-classes defined for the analysis of covariance. It was felt that adjusting these sub-classes to contain an equal or proportionate number of students--the usual procedure in covariance--would not give an accurate picture of the sample. Therefore a two by two analysis of covariance formula which allows for unequal numbers of observations in the sub-classes (Tsao, 1946) was utilized. This formula assumes significant interactions and uses the method of weighted means; it does not use an approximation.

Another problem appeared when close examination of the data revealed that the children had gained differentially in the various areas of achievement. It was originally felt that the sub-tests of the MAT could be combined to give the pupil a total change score which would represent his average gain in all the areas tested; however, it became obvious that a child's achievement gain might be misrepresented if this method were used. That is, a child could gain ten points in one half of the areas and lose ten points in the other half of the areas and obtain a total change score of zero, which would indicate that he had learned nothing over the treatment period. To avoid this misinterpretation, it was decided to run a separate analysis for each of the sub-tests. Because of this decision, whenever adjusted achievement change scores are used as the dependent variable, seven analyses of coveriance are run to test the hypothesis. Because of the replication of the design on the same subjects, there is no simple method of determining how much the significance level given by one of these tests depends upon the levels given by the others. Rather than being held to an arbitrary standard of 0.05 or 0.01 as an inflexible rule for interpreting differences, the reader may use his own discretion in deciding whether the interpretations offered by the author are justified. Should the analysis be repeated at this time, a multivariate analysis of covariance with repeated measures would be employed.

When internal students were compared to external students, the outcomes of the study were as follows:

1. Internal students had greater gains in achievement than did external students, leading to the inference that they learned more. (Tables 1-9)

2. Given seven tests of achievement, differences in the amount of teacher praise were accompanied by greater differences in achievement gain for external students than for internal students on the Usage Test, external students with high praise showing greater gain than external students with low praise. There were no significant differences in the other six tests. (Tables 1-3)

3. Given seven test of achievement, differences in the amount of teacher criticism were accompanied by greater differences in achievement gain for external students than for internal students on the Computation Test, external students with low criticism showing greater gain than external students with high criticism. There were no significant differences in the other six tests. (Tables 4-6)

4. Given seven tests of achievement, differences in the frequency of teacher use of pupils' ideas were accompanied by greater differences in achievement gain for external students than for internal students on the Punctuation and Capitalization Test, external students with teachers who tend to use their ideas showing greater gain than external students whose teachers seldom used their ideas. There were no significant differences in the other six tests. (Tables 7-9)

When high reinforcement teachers were compared with low reinforcement teachers the conclusions were as follows:

1. The students whose ideas were used more often by the teacher made greater achievement gains. (Tables 7 - 9)

2. High praise was accompanied by greater achievement gain scores when Parts of Speech, Punctuation, and Capitalization, Social Study Skills, and Problem Solving were measured; however, there were no significant differences on the Usage, Computation, and Language Study Skills Tests. (Tables 1 - 3)

3. Low criticism was accompanied by greater achievement gain on the tests measuring Punctuation, and Capitalization, Languages and Social Study Skills, and Problem Solving, while there were no significant diffferences on the Usage, Computation, and Parts of Speech Tests. (Tables 4-6)

The analysis of the data in this study has been restricted to the comparison of means. It is very probable that the distributions overlap. For this reason, care must be taken not to relate the findings to individuals. Indeed it is possible for an external child to perform like the "average" internal child and vice versa. Likewise, any high reinforcement teacher may evoke responses from the students that are "typical" of a low reinforcement teacher.

Although probability statistics were used, the samples selected were purposive samples; extreme groups were selected to maximize the likelihood of differences among the elements in the sample. This does not mean that there is no concern with the possibility of error.

Attempt were made to compare the teachers used in this sample with those from the total population in the school systems involved. This is consequential only to the extent that comparisons made have some bearing on the major variables investigated in the study. Demographic data on the children were gathered and appear consistent with those generally obtained from random samples of school populations. This discussion of these data suggested that no trends could be identified which would bias the tests of the hypotheses or restrict the generalizations to be made.

The results clearly support the hypothesis that Internal children learned more than did external children in the areas of language, study skills, and arithmetic skills. The belief that one's behavior determines whether or not reinforcement will occur is associated with a different kind of learning than is the belief that reinforcement is either unpredictable or dependent upon chance, fate, or powerful others.

In general, the interaction hypotheses are not supported by the findings. One way of interpreting these results is to dismiss the theory and adopt the positions that how children perceive the relationship between reinforcement and behavior is related to the variables hypothesized. However, this seems inconsistent with the differences found between the learning of internal and external children. One could accept the proposition that internal children perceive a stronger bond between reinforcement, behavior, and expectancy than do external children. At the same time one could maintain that the internal child depends on the reinforcement of the teacher as much as does the external child. If both propositions were supported, the internal children would be more affected by the teacher's reinforcement and the results would have been significant in the opposite direction.

Since some achievement areas produced significant results, and most of the other results were in the predicted direction, it is suggested here that the explanation lies not in theoretical error, but in a weakness in the design. It is entirely conceivable that some teachers who produce an aura of positive reinforcement in their classroom are differentially distributing reinforcement. If this is true, it is very likely that the internal children, by virtue of their higher achievement would receive a greater proportion of the reinforcement. It is suggested that before the theory is dismissed the study be repeated with observations directed toward the interaction of the teacher with specific students.

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